

UL 696

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Electric Toys





Underwriters Laboratories Inc. (UL)
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UL Standard for Safety for Electric Toys, UL 696

Ninth Edition, Dated March 15, 1996

Revisions: This Standard contains revisions through and including December 27, 2002.

Summary Of Topics

This revision of UL 696 is being issued to clarify requirements in the following sections: Scope, Construction (General), Enclosures (Enclosure of live parts), Coatings and Platings, Insulating Material, Automatic Controls, Protection Against Injury to Persons, Power Supply Connections (Cords and plugs), Humidity Conditioning Test; Strain Relief Tests (General), Temperature Test, Abnormal Operation Tests, Steam Engine Tests, Manufacturing and Production Test (Dielectric Voltage-Withstand Test), Ratings (General), Markings (Cautionary). A new definition of a tool is also provided in the Glossary.

UL Standards for Safety are developed and maintained in the Standard Generalized Markup Language (SGML). SGML -- an international standard (ISO 8879-1986) -- is a descriptive markup language that describes a document's structure and purpose, rather than its physical appearance on a page. Due to formatting differences resulting from the use of UL's new electronic publishing system, please note that additional pages (on which no requirements have been changed) may be included in revision pages due to relocation of existing text and reformatting of the Standard.

Text that has been changed in any manner is marked with a vertical line in the margin. Changes in requirements are marked with a vertical line in the margin and are followed by an effective date note indicating the date of publication or the date on which the changed requirement becomes effective.

The following table lists the future effective dates with the corresponding item.

Future Effective Date	References
December 1, 2006	7.2, 7.3, 35.1.1, and 35.2.1

The new and revised requirements are substantially in accordance with UL's Bulletin on this subject dated August 5, 2002. The bulletin is now obsolete and may be discarded.

The following editorial revisions are in accordance with the 2002 edition of the National Electrical Code and concern:

- the name of a color used to identify grounded conductors in Table 17.1
- the expression of wire gauge in 25.6

The revisions dated December 27, 2002 include a reprinted title page (page1) for this Standard.

As indicated on the title page (page 1), this UL Standard for Safety is an American National Standard. Attention is directed to the note on the title page of this Standard outlining the procedures to be followed to retain the approved text of this ANSI/UL Standard.

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New product submittals made prior to a specified future effective date will be judged under all of the requirements in this Standard including those requirements with a specified future effective date, unless the applicant specifically requests that the product be judged under the current requirements. However, if the applicant elects this option, it should be noted that compliance with all the requirements in this Standard will be required as a condition of continued Listing and Follow-Up Services after the effective date, and understanding of this should be signified in writing.

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This Standard consists of pages dated as shown in the following checklist:

Page	Date
1-12B	December 27, 2002
13	March 15, 1996
14	December 27, 2002
15-19	March 15, 1996
20-20B	August 5, 1998
21	December 27, 2002
22-24	March 15, 1996
25-32B	December 27, 2002
33	March 15, 1996
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The most recent approval of UL 696 as an American National Standard (ANSI) occurred on September 30, 2002 and covers the Ninth Edition, including the revisions through December 27, 2002. Approval of UL 696 as an American National Standard is maintained using the continuous maintenance process. Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Written comments are to be sent to UL-MEL Standards Department, 1285 Walt Whitman Road, Melville, New York 11747-3081.

An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc.

Revisions of this Standard will be made by issuing revised or additional pages bearing their date of issue. A UL Standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest set of revised requirements.

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FOREWORD

A. This Standard contains basic requirements for products covered by Underwriters Laboratories Inc. (UL) under its Follow-Up Service for this category within the limitations given below and in the Scope section of this Standard. These requirements are based upon sound engineering principles, research, records of tests and field experience, and an appreciation of the problems of manufacture, installation, and use derived from consultation with and information obtained from manufacturers, users, inspection authorities, and others having specialized experience. They are subject to revision as further experience and investigation may show is necessary or desirable.

B. The observance of the requirements of this Standard by a manufacturer is one of the conditions of the continued coverage of the manufacturer's product.

C. A product which complies with the text of this Standard will not necessarily be judged to comply with the Standard if, when examined and tested, it is found to have other features which impair the level of safety contemplated by these requirements.

D. A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, and that involves a risk of fire or of electric shock or injury to persons shall be evaluated using appropriate additional component and end-product requirements to maintain the level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this standard does not comply with this standard. Revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this standard.

E. UL, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of UL represent its professional judgment given with due consideration to the necessary limitations of practical operation and state of the art at the time the Standard is processed. UL shall not be responsible to anyone for the use of or reliance upon this Standard by anyone. UL shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Standard.

F. Many tests required by the Standards of UL are inherently hazardous and adequate safeguards for personnel and property shall be employed in conducting such tests.

INTRODUCTION

1 Scope

1.1 These requirements cover electrically-operated toys including miniatures of full-sized appliances that may not necessarily perform the expected function of the copied appliance and that are intended to be used on nominal 120-volt branch circuits. The package for the toy, including packaging material if intended to be used with the toy, is considered to be a part of the toy and is covered by these requirements. An electric product is considered a toy if it is designed, manufactured, or marketed as a plaything for children over the age of 3.

1.1 revised December 27, 2002

1.2 These requirements do not cover toys for outdoor use, normal, full-sized household products used for the entertainment of children (such as TVs, computers, radios, and VCRs), toy transformers, or appliances intended to operate from the secondary of a toy transformer at a potential of 30 volt rms or less. See Appendix B for a list of Standards covering products not considered under the scope of UL 696.

1.2 revised December 27, 2002

1.3 Deleted December 27, 2002

1.3 revised December 27, 2002

2 General

2.1 Components

2.1.1 Except as indicated in 2.1.2, a component of a product covered by this standard shall comply with the requirements for that component. See Appendix A for a list of standards covering components generally used in the products covered by this standard.

2.1.2 A component is not required to comply with a specific requirement that:

- a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard, or
- b) Is superseded by a requirement in this standard.

2.1.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.1.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

2.2 Units of measurement

2.2.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

2.2.2 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

2.3 Glossary

2.3.1 TOOL – Commonly available household implements, such as flat-bladed or cross-head recessed (Philips type) screwdrivers, wrenches, and pliers, that are suitable for installing or removing fasteners.

2.3.1 added December 27, 2002

CONSTRUCTION

3 General

3.1 Materials used in the construction of a toy shall not result in a risk of injury to persons, fire, or electric shock as specified in the Standard.

3.1 revised December 27, 2002

3.1.1 Construction is not limited to any particular material which is evaluated with respect to its intended use. An example of such a material would be a plastic compound that complies with the requirements of the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C.

3.1.1 added December 27, 2002

4 Mechanical Assembly

4.1 General

4.1.1 A toy shall be formed and assembled so that it will have the strength and rigidity required to resist the abuses to which it will be subjected without producing or increasing the risk of fire, electric shock, or injury to persons due to total or partial collapse with resulting reduction of spacings, loosening or displacement of parts, or other serious conditions.

4.1.1 revised December 27, 2002

4.1.2 A switch, lampholder, attachment-plug receptacle, motor-attachment plug, or similar component shall be mounted securely and prevented from turning.

Exception No. 1: A plunger or other type of nontoggle switch that does not tend to rotate when operated, and that is intended to be operated by mechanical means rather than by direct contact by persons, need not be prevented from turning if both of the following conditions are met:

a) The means by which the switch is mounted makes it unlikely that it can loosen as a result of being operated.

b) Rotation of an intentionally loosened switch does not reduce spacings below the minimum required values.

Exception No. 2: A lampholder of a type in which the lamp cannot be replaced (such as a neon pilot or indicator light in which the lamp is sealed in by a nonremovable jewel) need not be prevented from turning if rotation cannot reduce spacings below the minimum required values or produce stress on a connector.

4.1.3 The means for preventing the turning specified in 4.1.2 is to consist of more than friction between surfaces – for example, a lock washer, properly applied, is capable of being used as the means of preventing turning of a device having a single-hole mounting means.

4.1.4 A toy shall be assembled so that the vibration of usual operation will not affect it adversely.

4.1.5 A current-carrying component of a heating element shall be completely and individually enclosed in nonorganic material and shall be supported within this enclosure in an acceptable manner. Breakage of a heating element at any point shall not result in the element contacting a dead-metal part.

4.1.6 A toy intended to be used with food shall be constructed to exclude water from any electrical area that could present any risk of fire, electric shock, or injury to persons.

4.2 Use of water

4.2.1 A toy shall not be used in water. An electric toy shall not be intended to be immersed in water or have a shape or construction (such as a boat) that suggests use in water.

Exception: A toy, such as a steam engine, may use water if the electrical components are separate from the water reservoir and are contained in a sealed chamber.

4.2.2 A toy, such as a steam engine, that operates with a gas or liquid under pressure shall be investigated with regard to the possibility of explosion and shall be provided with a pressure-relief valve, the discharge of which is directed or regulated so as to minimize any effect of the discharge (such as wetting of electrical conductors or direct human contact with the discharge).

5 Enclosures

5.1 General

5.1.1 A toy shall be provided with an enclosure of material intended for the particular application that shall enclose all electrical parts that can present the risk of fire, electric shock, or injury to persons under any conditions of use.

5.2 Polymeric enclosures

5.2.1 Enclosures of polymeric material shall comply with the requirements for polymeric materials used in electrical equipment evaluations.

5.3 Enclosure of live parts

5.3.1 An enclosure containing a wire, splice, brush cap, connection, or electrical component at a potential of more than 30 volts rms (42.4 V peak) to any other part or to ground shall:

- a) Be assembled by welding, riveting, the use of special screws that are not removable with a tool used in the intended manner, or the equivalent and
- b) Have no opening that will permit entry of a straight rod 1/4 inch (6.4 mm) in diameter.

Exception: These requirements do not apply to the electrodes of a replaceable incandescent lamp and its lampholder contacts if the contacts are located in an insulating husk or the equivalent.

5.3.2 With respect to item (a) of 5.3.1, cross-notch-head screws, spring clips, bent tabs, and similar fasteners are removable with tools, such as pliers and flat-bladed screwdrivers.

Exception: Bent tabs may be used if, by virtue of metal thickness or other factors, they successfully resist attempts to open them with a tool.

5.3.2 revised December 27, 2002

5.3.3 An enclosure containing an uninsulated live part at a potential of more than 30 V rms (42.4 V peak) to any other part or to ground shall have no opening through which a 0.010 inch (0.25 mm) diameter wire can be inserted to contact the live part.

Exception: This requirement does not apply to the electrodes of a replaceable incandescent lamp and its lampholder contacts if the contacts are located in an insulating husk or the equivalent.

5.4 Cast and sheet metal

5.4.1 For unreinforced, flat surfaces in general, cast metal shall not be less than 1/8 inch (3.2 mm) thick.

Exception No. 1: Malleable iron shall not be less than 3/32 inch (2.4 mm) thick and die-cast metal shall not be less than 5/64 inch (2.0 mm) thick.

Exception No. 2: For a curved, ribbed, or otherwise reinforced surface, or if the shape, size, or both, of the surface is such that mechanical strength is provided, cast metal in general shall not be less than 3/32 inch (2.4 mm) thick, malleable iron shall not be less than 1/16 inch (1.6 mm) thick, and die-cast metal shall not be less than 3/64 inch (1.2 mm) thick.

5.4.2 An enclosure of sheet metal shall be evaluated with regard to its size, shape, thickness of metal, and its acceptability for the particular application, considering the intended use of the complete toy. Sheet steel thinner than 0.026 inch (0.66 mm) is capable of being used only for relatively small areas or for surfaces that are curved or otherwise reinforced.

5.5 Exposed live parts

5.5.1 An exposed live part in a toy shall not have a potential to any other part or to ground greater than 30 volts rms (42.4 volts peak).

Exception: An electrode of a replaceable incandescent lamp and its lampholder contacts need not comply with this requirement if the contacts are located in an insulating husk or the equivalent.

5.5.2 A toy provided with one or more lampholders shall be constructed so that no live part other than lampholder contacts are exposed to contact by persons removing or replacing lamps.

5.6 Lamps and lampholders

5.6.1 An enclosure containing a lamp shall protect it from breakage.

5.6.2 A replaceable incandescent lamp having a voltage between any of its electrodes or lampholder contacts greater than 30 volts rms (42.4 volts peak) and any other part or ground shall be located inside an enclosure that has at least one door or cover permitting access to the lamp. Opening any such door or cover shall require release of a latch or other fastening means (bent tabs are not to be used), and the door or cover shall be captive to the toy, or its closed position shall be essential to the operation of the toy. With all access doors and covers closed there shall be no opening in the enclosure that will permit the entry of a 6-inch (152-mm) long straight rod 1/4 inch (6.4 mm) in diameter that can contact an uninsulated live part when the lamp bulb is either removed or in place. The lamp is to be spaced away from any edge of any opening a distance at least two times the minor diameter of the opening. Release of the latch or other fastening means shall be by use of the keys or specific purpose tools but shall not be by the use of the hand or fingers alone, or by the use of a tool.

5.6.3 The screw shells of all lampholders for incandescent lamps shall be at the same potential.

5.6.4 If a contact of a lampholder for a replaceable incandescent lamp involves a potential to any other part or to ground greater than 30 volts (42.4 volts peak), one or both of the lampholder contacts shall be in the bottom of the lampholder body, or within an insulating husk, or the equivalent.

5.6.5 The screw shell of an Edison-base lampholder shall be connected to the terminal or lead that is intended to be connected to the grounded conductor of the power supply cord. Table 17.1 specifies the identification of the power supply cord conductor intended to be grounded.

5.6.5 revised December 27, 2002